

1 CLAIMS:

2 /1. An apparatus for injecting coiled tubing into a hole in
3 the earth's surface comprising:

4 a frame having a front end and a back end;

5 a tubing storage spool removably mounted on said frame
6 at said back end and having said coiled tubing
7 stored thereon;

8 a mast pivotally mounted on said frame;

9 an injector reel rotatably mounted on said mast, said
10 injector reel pivotable from a first stored
11 position at said front end to a second tubing
12 injecting position;

13 a drive mechanism attached to said injector reel to
14 rotate said injector reel; and

15 a hold down assembly mounted around a portion of the
16 circumference of said injector reel for exerting a
17 pressure against said coiled tubing over more than
18 90° of said injector reel when said injector reel is
19 in said second operative position and said coiled
20 tubing is directed between said hold down assembly
21 and said circumference of said injector reel to
22 provide positive engagement of said tubing by said
23 injector reel when said injector reel is being
24 rotated to pull said tubing off of said tubing
25 storage spool or return said tubing to said tubing
26 storage spool.

1 2. The apparatus of claim 1 wherein said hold down assembly
2 further comprises a bracket attached to said circumference of
3 said injector reel, said bracket having an adjustment member
4 for varying the pressure of a roller against said coiled
5 tubing.

6 3. The apparatus of claim 1 wherein said second tubing
7 injecting portion positions said injector reel above said back
8 end of said frame, said mast extending generally perpendicular
9 to said frame, and said coiled tubing exiting said apparatus
10 generally perpendicularly to said surface.

11 4. The apparatus of claim 1 wherein said second tubing
12 injecting position positions said injector reel above said
13 front end of said frame, and said coiled tubing exits said
14 apparatus at an angle less than 90° to said surface.

15 5. The apparatus of claim 1 further comprising a first
16 tubing stabilizer assembly mounted within said frame and a
17 second tubing stabilizer mounted above said hole in said
18 surface.

19 6. The apparatus of claim 1 wherein said tubing storage
20 spool is further removably mounted to an adjustable cradle
21 frame having opposed pivotable bullnose arms.

22 7. The apparatus of claim 1 wherein said opposed pivotable
23 bullnose arms are horizontally slidably attached to said
24 cradle frame to accept a range of storage spool widths.

17

1 8. The apparatus of claim 1 wherein said opposed pivotable
2 bullnose arms are vertically slidably attached to said cradle
3 frame to accept a range of storage spool diameters.

4 9. The apparatus of claim 1 wherein said drive mechanism is
5 of adjustable length to accommodate a range of storage spool
6 diameters.

7 10. An apparatus for injecting coiled tubing into the earth's
8 surface comprising:

9 a frame having a front end and a back end;

10 a tubing storage reel removably mounted on said frame
11 and having coiled tubing stored thereon;

12 an injector reel rotatably mounted on said frame;

13 a mast pivotally mounted on said frame;

14 a drive mechanism attached to said injector reel to
15 rotate said injector reel;

16 a multiplicity hold down mechanism mounted around a
17 portion of the circumference of said injector reel
18 for exerting a variable pressure against said
19 coiled tubing when said coiled tubing is directed
20 between said hold down assembly and said
21 circumference of said injector reel to provide
22 positive engagement of said tubing by said injector
23 reel when said injector reel is being rotated to
24 pull said tubing off of said tubing storage reel or
25 return said tubing to said tubing storage reel,
26 each of said hold down assembly further comprising:

1 a bracket attached to said circumference of said
2 injector reel, said bracket having an
3 adjustment member for varying the pressure of
4 a roller against said coiled tubing; and
5 a tubing straightener mechanism attached to said
6 injector reel.

7 ✓11. A method of retrieving a length of coiled tubing and
8 storing said tubing on a tubing storage spool comprising:

9 rotating a reel;

10 exerting pressure against more than 90° of the
11 circumference of said reel while running said
12 tubing around a portion of said circumference
13 to exert pressure against said tubing to cause
14 positive engagement of said tubing by said
15 reel; and

16 routing said tubing off of said reel onto said
17 tubing storage spool, said tubing storage
18 spool mounted on a cradle vertically and
19 horizontally adjustable to accept varying
20 spool widths and diameters.

19